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09/998,427	12/03/2001	Ichirou Miyagawa	Q66498	5968

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EXAMINER

PHAM, HAI CHI

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,427

Applicant(s)

MIYAGAWA, ICHIROU

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-10 and 12-14 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 13 May 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 05/13/03 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Objections

2. Claim 11 is objected to because of the following informalities:

- Claim 11 is objected for improperly claiming dependency from itself, i.e., "according to claim 11" at line 1 should read --according to claim 10--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4:

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- Claim 4 is rejected for introducing several unknown variables, namely, L , θ_a , Φ_1 , which are not defined. It is requested that the above variables be defined for what they represent in the claimed equations.

Claim 14:

- The following limitation "said tilt angle changing unit makes, ..., said change in exposure condition from said first exposure condition to said second exposure condition during a subscan of a width of an area of a recording material (emphasis added)" appears to be misleading in that it indicates that the change of the exposure condition is made while the exposure head is performing the sub-scan of the recording material. In other words, the exposure head is capable of writing at two different pitches during the single exposure of the recording material, a subject matter not supported by the disclosure. However, for the purpose of completing the examination of the claim, the above limitation would be interpreted as comprising a change in the exposure condition being made in the sub-scanning direction.

Claim 5 is dependent from claim 4, and is therefore indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Kubokawa (U.S. 6,330,019 B1).

Kubokawa discloses an multi-beam exposure unit comprising a multibeam light source (2) which exposes a recording material by main scanning, said multibeam light source having a first multiple beam forming light source in which a plurality of beam emitting ports are arranged parallel to each other while being spaced apart from each other by a predetermined distance, and a second multiple beam forming light source in which a plurality of beam emitting ports are arranged parallel to each other being spaced apart from each other by said predetermined distance, said plurality of beam emitting ports in said second multiple beam forming light source being placed parallel to the parallel arrangement direction of the beam emitting ports in said first multiple beam forming light source while being spaced apart by a predetermined distance from the same, and the position of the beam emitting port at one end of said second multiple

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beam forming light source being shifted in the parallel direction relative to the position of the beam emitting port at the corresponding end of said first multiple beam forming light source (the multiple light source having several rows of light emitting ports 32 are arranged in parallel at equal intervals (Fig. 3), each row of light emitting ports being shifted in the arrangement direction by a distance S with respect to the other rows (Fig. 4)), and wherein an end most beam source of the first multiple beam forming light source and an end most beam source of the second multiple beam forming light source do not overlap each other (col. 5, lines 29-34). With regard to claim 14, Kubokawa further teaches the multiple light sources or optical fibers being tilted to shorten the distance between two-neighboring optical fibers in the sub-scanning direction to achieve a higher resolution (col. 1, lines 27-35).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-3, 6-8, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubokawa in view of Ferschl et al. (U.S. 5,196,866).

With regard to claim 2, Kubokawa discloses an multi-beam exposure unit comprising a multibeam light source (2) which exposes a recording material by main scanning, said multibeam light source having a first multiple beam forming light source

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in which a plurality of beam emitting ports are arranged parallel to each other while being spaced apart from each other by a predetermined distance, and a second multiple beam forming light source in which a plurality of beam emitting ports are arranged parallel to each other being spaced apart from each other by said predetermined distance, said plurality of beam emitting ports in said second multiple beam forming light source being placed parallel to the parallel arrangement direction of the beam emitting ports in said first multiple beam forming light source while being spaced apart by a predetermined distance from the same, and the position of the beam emitting port at one end of said second multiple beam forming light source being shifted in the parallel direction relative to the position of the beam emitting port at the corresponding end of said first multiple beam forming light source (the multiple light source having several rows of light emitting ports 32 are arranged in parallel at equal intervals (Fig. 3), each row of light emitting ports being shifted in the arrangement direction by a distance S with respect to the other rows (Fig. 4). With regard to claim 8, Kubokawa also teaches an outer drum (9) capable of performing main scanning on the recording material (8) by having the recording material fitted and rotated around its outer cylindrical surface (Fig. 1).

Although Kubokawa teaches the multiple light sources or optical fibers being tilted to shorten the distance between two-neighboring optical fibers in the sub-scanning direction to achieve a higher resolution (col. 1, lines 27-35), Kubokawa does not explicitly include a tilt angle changing unit (claims 1, 8), the tilt angle changing unit

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comprising a rotary unit and a base unit (claim 10), and the tilt angle changing unit and the optical unit being fixed to a movable table (claim 12).

Regardless, it is well known in the printing art to provide such tilt angle changing unit in the printing device such that the printing resolution can be changed as evidenced by Ferschl et al., which discloses an image forming apparatus comprising a movable writing head, the writing head assembly, which has a plurality of light emitting elements and a plurality of optical fibers (60) linearly arranged, being provided on a tubular member (54) that can be rotated to change the writing angle of the linear array (60) to correspond to the preselected resolution (col. 8, lines 1-32). Ferschl et al. further teaches the tilt angle changing unit including a rotary unit (tubular member 54 with a keyway 59), and a base unit (barrel portion 50 whose key matches with the keyway 59), and the movable exposure head assembly along with the lens (6) being mounted on the moving translator member (16, Fig. 1).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provided a tilt angle changing unit as taught by Ferschl et al. in the device of Kubokawa. The motivation for doing so would have been to provide the printing device with the flexibility to print a various resolutions as suggested by both Kubokawa and Ferschl et al.

With regard to claims 3, 6-8, Kubokawa further teaches, respectively:

- the higher resolution formed by the above tilt angle would provide a desired pitch;

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- a lens (zoom lens 6), which determines the imaging magnification (magnification or reduction) of the optical system, the lens being provided in the optical path of the first and second multiple beams;
- the multiple light sources having an optical fiber array (4).

9. Alternatively, claims 2-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (Pub. No. 2002/0015088 A1) in view of Ferschl et al.

Inoue et al. discloses an optical recording head comprising a multi-beam light source (14) which exposes a recording material by main scanning, the multiple light source having several rows of light emitting ports arranged in parallel to each other and at equal intervals, the following row of light emitting ports being shifted in the arrangement direction by a distance a_s/n relative to the previous row (Fig. 5), an outer drum (91). Inoue et al. further suggests tilting the multi-beam light source in the sub-scanning direction to obtain a desired resolution (paragraph [0209]), but fails to teach the tilt angle changing unit.

Regardless, it is well known in the printing art to provide such tilt angle changing unit in the printing device such that the printing resolution can be changed as evidenced by Ferschl et al., which discloses an image forming apparatus comprising a movable writing head, the writing head assembly, which has a plurality of light emitting elements and a plurality of optical fibers (60) linearly arranged, being provided on a tubular member (54) that can be rotated to change the writing angle of the linear array (60) to correspond to the preselected resolution (col. 8, lines 1-32). Ferschl et al. further

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teaches the tilt angle changing unit including a rotary unit (tubular member 54 with a keyway 59), and a base unit (barrel portion 50 whose key matches with the keyway 59), and the movable exposure head assembly along with the lens (6) being mounted on the moving translator member (16, Fig. 1).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provided a tilt angle changing unit as taught by Ferschl et al. in the device of Inoue et al. The motivation for doing so would have been to provide the printing device with the flexibility to print a various resolutions as suggested by both Inoue et al. and Ferschl et al.

With regard to claims 3, 6, 7, Inoue et al. further teaches an optical system (lens system or rod lens) being used (paragraphs [0112] and [0314]), the multi-beam light source having an optical fiber array.

With regard to claims 4-5, Inoue et al. further teaches the distance (b) between the rows of light emitting ports as well as the width of the shift (a_s/n) between each row of the light emitting ports being related to the angle of tilt (Figs. 28, 44), but does not explicitly establish the convoluted relationship between various parameters as claimed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to correlate the various parameters to provide a specific value for the abovementioned distance and the width of shift, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

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10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubokawa in view of Ferschl et al., as applied to claims 2-3 above, and further in view of Okazaki et al. (Pub. No. U.S. 2002/0090172 A1).

Kubokawa, as modified by Ferschl et al., discloses all the basic limitations of the claimed invention except for the collimator lens and the imaging lens.

Okazaki et al. discloses an exposure apparatus having an exposure head including a multiplex laser light source, optical fiber array (131), a light collecting optics (132) for collimating the plural laser beams, and an imaging lens (134) for focusing and exposing the surface of the recording material (F), the exposure head forming a main scanning of the recording material along the rotating direction of the drum (150) while being move in the horizontal direction for performing the sub-scan exposure of the recording material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the optic system as taught by Okazaki et al. in the modified device of Kubokawa. The motivation for doing so would have been to allow the laser beams emitted form a high density configuration of multiplex light sources be collected and converged onto the recording material.

Allowable Subject Matt

11. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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12. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of the claimed invention, with respect to claim 11, is the inclusion of the limitation, in the combination as currently claimed, that the exposure apparatus includes a tilt angle changing unit, which comprises a first member and a second member located between a rotary unit and a base unit wherein the first member and the second member limit a tilt angle point by a predetermined range by limiting the movement of a projecting member fixed to the rotary unit. the combined limitations are not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

Response to Arguments

13. Applicant's arguments with respect to claims 2-14 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

Contact information

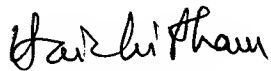
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



HAI PHAM
PRIMARY EXAMINER

July 22, 2003